CLAIMS

1. Compounds of formula I

wherein

X and Y represent CH, CH₂ or a divalent or trivalent heteroatom under the proviso that X and Y are not simultaneously CH or CH₂;

m and o represent independently of each other 0 or 1, with the proviso that

if m is 0 then the dotted line between Y and the neighboring C atom represents a bond and Y is CH or a trivalent heteroatom,

if m is 1 then the dotted line between Y and the neighboring C atom is absent and Y is CH₂ or a divalent heteroatom,

if o is 0 then the dotted line between X and the neighboring C atom represents a bond and X is CH or a trivalent heteroatom.

if o is 1 then the dotted line between X and the neighboring C atom is absent and X is CH₂ or a divalent heteroatom;

A represents (CR₃R₄)_p and Q represents (CR₉R₁₀)_n;

n and p represent independently of each other 0 or 1;

R₆, R₇, R₁₃, and R₁₄ denote independently of each other hydrogen, halogen, (C₁₋₄)alkyl, (C₁₋₄)alkylSO₂, SO₃H, carboxy, (C₁₋₄)alkoxy carbonyl, (C₁₋₄)alkoxy, OH or NR₁₅R₁₆;

 R_1 , R_2 , R_3 , R_4 , R_9 , R_{10} , R_{11} and R_{12} denote independently of each other hydrogen, (C_{1-4})alkyl, carboxy, (C_{1-4})alkoxy carbonyl or (C_{1-4})alkoxy, or, when X is CH or CH₂ then R_1 and R_2 can also be OH or NR₁₅R₁₆, or when Y is CH or CH₂ then R_{11} , R_{12} can also be OH or NR₁₅R₁₆;

 R_5 , R_8 , R_{15} and R_{16} are independently of each other hydrogen, (C_{1-4}) alkyl, (C_{1-4}) alkyl, (C_{1-4}) alkyl or (reactive group)- (C_{1-4}) alkyl; and

R₁₇ represents hydrogen or (C₁₋₄)alkyl;

in free base or acid addition salt form.

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- 2. A compound of formula I according to claim 1 in free base or acid addition salt form wherein X is O, S or CH₂ and Y is O, S or CH₂ with the proviso that X and Y are not both simultaneously CH₂.
- 3. A compound of formula I according to claim 1 wherein said compound is selected from
- 4,8-dimethyl-2,3,4,9,10,11-hexahydro-1,6-dioxa-4,13-diaza-8-azonia-pentacen chloride;
- 8-ethyl-4-methyl-2,3,4,9,10,11-hexahydro-1,6-dioxa-4,13-diaza-8-azonia-pentacen chloride;
- 4,8-dimethyl-3,8,9,10-tetrahydro-2H-1,6,11-trioxa-8,13-diaza-4-azonia-pentacen tetrafluoroborate;
- 4,8-dimethyl-2,3,9,10-tetrahydro—4H-1,6-dioxa-11-thia-4,13-diaza-8-azonia-pentacen chloride; and
- 8-(3-ethoxycarbonyl-propyl)-4-methyl-3,8,9,10-tetrahydro-2H-1,6,11-trioxa-8,13-diaza-4-azonia-pentacen chloride.
- 4. A composition comprising a compound according to of any one of claims 1-3 and a pharmaceutically acceptable excipient or diluent.
- 5. A process for the production of a compound of formula I or a salt thereof, comprising the steps of reacting a phenol derivative of formula III

wherein the radicals and symbols A, X, R_1 , R_2 , R_5 , R_6 , R_{14} and o have the meanings as defined in claim 1 for a compound of formula I, with a nitroso or diazo compound of formula IV

wherein the radicals and symbols Q, Y, R₇, R₈, R₁₁, R₁₂, R₁₃ and m have the meanings as defined in claim 1 for a compound of formula I, R₁₈ represents oxo or p-nitrophenyl-N= and R₁₉ represents hydroxy;

and recovering the resulting compound of formula I in free base form or in form of an acid addition salt.

- 6. A method of labeling target structures in the brain comprising:
- (i) applying a composition comprising a compound of formula I

wherein

X and Y represent CH, CH₂ or a divalent or trivalent heteroatom under the proviso that X and Y are not simultaneously CH or CH₂;

m and o represent independently of each other 0 or 1, with the proviso that

if m is 0 then the dotted line between Y and the neighboring C atom represents a bond and Y is CH or a trivalent heteroatom,

if m is 1 then the dotted line between Y and the neighboring C atom is absent and Y is CH₂ or a divalent heteroatom,

if o is 0 then the dotted line between X and the neighboring C atom represents a bond and X is CH or a trivalent heteroatom,

if o is 1 then the dotted line between X and the neighboring C atom is absent and X is CH₂ or a divalent heteroatom;

A represents $(CR_3R_4)_p$ and Q represents $(CR_9R_{10})_n$; n and p represent independently of each other 0 or 1;

- R₆, R₇, R₁₃, and R₁₄ denote independently of each other hydrogen, halogen, (C₁₋₄)alkyl, (C₁₋₄)alkylSO₂, SO₃H, carboxy, (C₁₋₄)alkoxy carbonyl, (C₁₋₄)alkoxy, OH or NR₁₅R₁₆;
- R_1 , R_2 , R_3 , R_4 , R_9 , R_{10} , R_{11} and R_{12} denote independently of each other hydrogen, (C_{1-4})alkyl, carboxy, (C_{1-4})alkoxy carbonyl or (C_{1-4})alkoxy, or, when X is CH or CH₂ then R_1 and R_2 can also be OH or NR₁₅R₁₆, or when Y is CH or CH₂ then R_{11} , R_{12} can also be OH or NR₁₅R₁₆;
- R_5 , R_8 , R_{15} and R_{16} are independently of each other hydrogen, (C_{1-4}) alkyl, (C_{1-4}) alkoxy, R_{17} O-C(O)- (C_{1-4}) alkyl or (reactive group)- (C_{1-4}) alkyl; and

R₁₇ represents hydrogen or (C₁₋₄)alkyl; in free base or acid addition salt form, or of formula II

wherein

R₆, R₇, R₁₃, and R₁₄ denote independently of each other hydrogen, halogen, (C₁₋₄)alkyl, (C₁₋₄)alkylSO₂, SO₃H, carboxy, (C₁₋₄)alkoxy carbonyl, (C₁₋₄)alkoxy, OH or NR₁₅R₁₆, and R₂₁ and R₂₂ are hydrogen, (C₁₋₄)alkyl, (C₁₋₄)alkoxy, phenyl, phenylalkyl, carboxy or halogen; R₁₄ and R₂₂ together with the carbon atoms to which they are attached can also form a saturated or unsaturated ring;

R₂₁ and R₁₃ together with the carbon atoms to which they are attached can also form a saturated or unsaturated ring;

 R_5 , R_8 , R_{20} and R_{23} are hydrogen, (C_{1-4})alkyl, (C_{1-4})alkoxy, polyoxyhydrocarbyl, phenyl, phenylalkyl;

R₈ and R₂₀ together with the nitrogen atom to which they are attached can form a saturated or unsaturated ring.

R₂₃ and R₅ together with the nitrogen atom to which they are attached can form a saturated or unsaturated ring,

- R₂₂ and R₂₃ together with the atoms to which they are attached can form a saturated or unsaturated ring,
- R₅ together with R₆ together with the atoms to which they are attached can form a saturated or unsaturated ring,
- R₇ together with R₈ together with the atoms to which they are attached can form a saturated or unsaturated ring,
- R₂₀ together with R₂₁ together with the atoms to which they are attached can form a saturated or unsaturated ring,
- (ii) allowing sufficient time for said compound to be chemically associated with the target structure in the brain, and
- (iii) detecting said compound using near-infrared radiation.
- 7. The method according to claim 6 wherein said target structures are amyloid plaques.
- 8. The method according to claim 7 for Identifying diseases related to amyloid plaque generation and/or aggregation.
- 9. The method according to claim 7 or claim 8 for identifying Alzheimer's disease.
- 10. Use of a compound of formula I according to any one of claims 1-3 in free base or acid addition salt form as a near-infrared imaging agent.
- 11. Use of a compound of formula II as defined in claim 6 as a near-infrared imaging agent.
- 12. Use according to claims 10 or 11 as a near-infrared imaging agent to image amyloid plaques.
- 13. A conjugate comprising a compound of formula I according to any one of claims 1-3 covalently linked to a biomolecule through a reactive group.
- 14. A conjugate according to claim 13 wherein the biomolecule is selected from the group consisting of nucleoside, nucleotide, oligonucleotide, nucleic acid, protein, peptide, amino

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acid, polysaccharide, oligosaccharide, monosaccharide, drug or a small molecule having a molecular weight of less than 500.

15. A conjugate according to claim 13 or 14 capable of being detected using near-infrared radiation.